

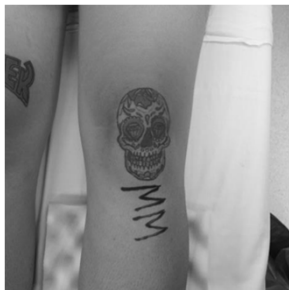
Patellofemoral Pathology

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I have disclosed that I am a consultant for Biomet Orthopaedics.

Anterior Knee Pain



Anterior Knee Pain

- ⊗ Patellar chondromalacia
- ⊗ Patellofemoral Pain
- ⊗ Patellofemoral syndrome PFS
- ⊗ Loose kneecaps
- ⊗ Patellar malalignment
- ⊗ Girl's knees
- ⊗ Tendinitis
- ⊗ Growing pains

- ⊗ Important to differentiate pain versus instability
- ⊗ Symptoms can overlap, but typically caused by one or the other



Patellofemoral Syndrome

- ⊗ Pathology
 - ⊗ Overuse
 - ⊗ Malalignment
 - ⊗ Trauma



- ⊗ Increased subchondral bone activity
- ⊗ Typically normal radiological studies
 - ⊗ Including MRI

PFS - History

- ⊗ Typically atraumatic
 - ⊗ Sometimes describe remote injury or fall
- ⊗ Can describe knee giving way or buckling
 - ⊗ But not a true dislocation or subluxation
- ⊗ Pain with stairs
- ⊗ Pain with prolonged knee flexion
- ⊗ Can have some anterior swelling
 - ⊗ But not a frank effusion

PFS - Exam

- ⊗ Pain with patellar compression/grind
 - ⊗ Differentiate from patellar apprehension
- ⊗ Rule out
 - ⊗ Patellar tendinitis
 - ⊗ Pes anserine bursitis
 - ⊗ Medial plica
 - ⊗ Saphenous neuritis
 - ⊗ IT band syndrome

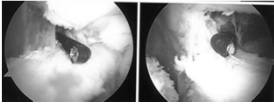


PFS - Management

- ⊗ Nonsurgical - Mainstay of treatment
 - ⊗ Activity modification
 - ⊗ Quadriceps Strengthening
 - ⊗ Closed versus open chain
 - ⊗ Traditional Isolated VMO exercises
 - ⊗ Not supported by recent literature
 - ⊗ Hip/Core strengthening
 - ⊗ Flexibility - quadriceps
 - ⊗ Bracing/Taping

PFS - Management

- ⊗ Surgical
 - ⊗ Rarely necessary
 - ⊗ Minimum 3 months of compliant rehab
 - ⊗ Reconsider differential diagnosis
- ⊗ Lateral release
 - ⊗ For lateral patellar tilt
 - ⊗ No history of patellar instability
 - ⊗ Minimal patellar chondromalacia



Patellar instability



Epidemiology

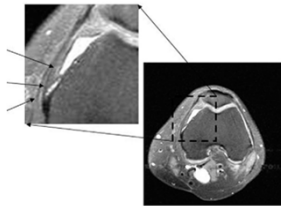


- ⊗ Annual incidence 5.8/100,000
 - ⊗ 30-40/100,000 in 10-17 year old population
- ⊗ 11% Musculoskeletal Symptoms in office setting
- ⊗ Higher incidence in females
- ⊗ Etiology
 - ⊗ 61-89% associated with sporting activities/military
 - ⊗ Mechanism
 - ⊗ Indirect 66-82% - noncontact
 - ⊗ Direct – medial or lateral contact at 20-30deg of flexion

Anatomy

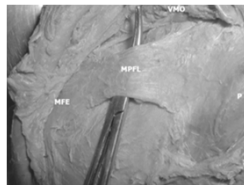
- ⊛ Early Flexion
 - ⊛ Only distal patella in contact with trochlear groove
 - ⊛ Quadriceps – dynamic stabilizer
 - ⊛ MPFL – primary static restraint to lateral translation
- ⊛ 20 deg flexion
 - ⊛ Patella engages in trochlear groove
 - ⊛ Stability due to lateral trochlea and medial soft tissues
 - ⊛ Past 90deg – medial facet articulates with lateral aspect of MFC

Anatomy



- ⊛ 3 layers of medial knee
 - ⊛ 1 – VMO fascia
 - ⊛ 2 – Sup MCL/POL, **MPFL**
 - ⊛ 3 – Deep MCL
- ⊛ MPFL
 - ⊛ Inserts on superomedial patella, 6mm below superior pole
 - ⊛ Origin – entire height of anterior aspect of medial femoral epicondyle
 - ⊛ Anterior and distal to add tubercle
 - ⊛ Posterior and superior to medial epicondyle

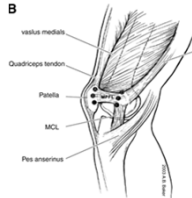
Anatomy



- ⊛ MPFL
 - ⊛ Thickening of medial retinaculum
 - ⊛ Early studies found variable existence of MPFL
 - ⊛ More recent studies have shown a distinct structure 100%
 - ⊛ Mean failure load – 208N
 - ⊛ Almost universally disrupted in patella dislocation
 - ⊛ Typically avulsed off femoral insertion
 - ⊛ Less commonly intrasubstance tear
 - ⊛ Rarely off patella → in Adults

biomechanics

- ⊗ Isolated sectioning of MPFL – 50% increase in lateral translation of patella
- ⊗ MPFL resists lateral patellar translation from 20-90deg
 - ⊗ Minimal contribution to stability past 90deg
 - ⊗ Due to bony constraint of femoral trochlea



Physical exam

- ⊗ Effusion
 - ⊗ Hemarthrosis
 - ⊗ ACL
 - ⊗ Meniscus
 - ⊗ Patella dislocation
- ⊗ Joint line tenderness
- ⊗ Thorough ligamentous exam ^A
- ⊗ Apprehension test/Laxity
- ⊗ Compare contralateral side/signs of hyperlaxity



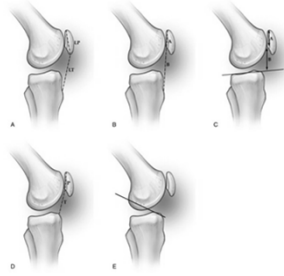
Associated Injuries

- ⊗ Osteochondral Injury – up to 70% in first time dislocations
 - ⊗ Medial patellar facet
 - ⊗ Lateral femoral condyle
 - ⊗ Loose bodies



Imaging

- ⊗ Radiographs
 - ⊗ AP
 - ⊗ Lateral
 - ⊗ Patellar Height
 - ⊗ Insall-Salvati
 - ⊗ Modified Insall-Salvati
 - ⊗ Blackburne-Peel
 - ⊗ Caton-Deschamps
 - ⊗ Blumensaat line

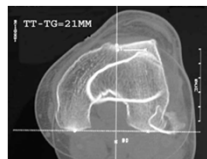


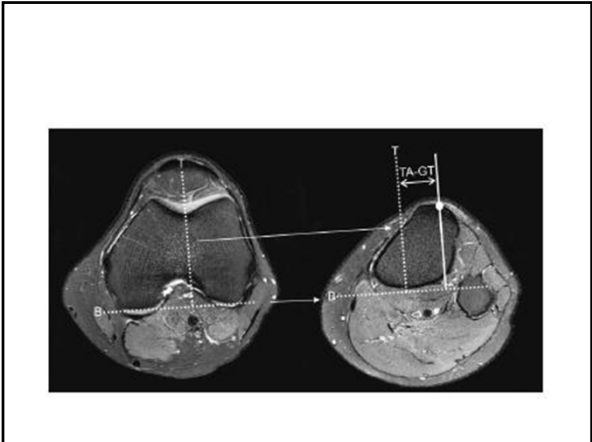
Imaging

- ⊗ MRI
 - ⊗ Confirm injury
 - ⊗ Evaluate ACL, MCL, meniscus
 - ⊗ Evaluation of medial-sided structures
 - ⊗ 85% sensitive for MPFL injuries
 - ⊗ 50-80% MPFL disrupted from femoral origin
 - ⊗ Identifying chondral injuries/loose bodies
 - ⊗ Typical bone bruise pattern

Imaging

- ⊗ Dejour et al 1994
 - ⊗ CT and Radiographic Factors contributing to patellar instability
 - ⊗ Trochlear Dysplasia (86%)
 - ⊗ Quadriceps Dysplasia – affecting patellar tilt (83%)
 - ⊗ Patella alta – Caton-Deschamps 1.2 or greater (24%)
 - ⊗ **TT-TG ≥ 20mm (56%)**





management

- ⊗ Nonoperative treatment – acute dislocation
 - ⊗ Immobilization 3-6 weeks
 - ⊗ Stiffness
 - ⊗ Similar recurrence as early motion
 - ⊗ Immediate functional rehabilitation
 - ⊗ Functional patellar brace
 - ⊗ Early rom
 - ⊗ Closed chain exercises
- ⊗ 40-50% recurrence rate either treatment
 - ⊗ Only 16% return to play by 6 weeks
 - ⊗ Only 2/3 RTP by 6 months

management

- ⊗ Operative indications – controversial
 - ⊗ Osteochondral loose bodies
 - ⊗ Failure of nonoperative management
 - ⊗ Recurrent instability
 - ⊗ Avulsion of MPFL – femur or patella
 - ⊗ Persistent patellar subluxation
- ⊗ Consider age, activity level
- ⊗ Proximal realignment
- ⊗ Distal realignment

Operative Treatment

- ⊛ More than 100 described operations
 - ⊛ REPAIR
 - ⊛ RECONSTRUCT
 - ⊛ RELEASE
 - ⊛ REALIGN
- ⊛ No defined Gold Standard operation
 - ⊛ lack of prospective randomized trials
 - ⊛ No two studies have used the exact same procedure

MPFL Repair

- ⊛ Medial Retinacular Repair (Reefing)
 - ⊛ Injury to the medial structures is a constant
 - ⊛ Useful for acute traumatic dislocation with loose body
 - ⊛ Or failed nonoperative treatment
 - ⊛ Mainstay of early surgical treatment of these injuries
 - ⊛ Combined with lateral release

Case 1

- ⊛ 15 yo male seen 2 days after twisting injury to Left knee while landing after a lay-up
 - ⊛ Large effusion
 - ⊛ Difficult exam
 - ⊛ No frank apprehension
 - ⊛ 2+ med/lat instability – symmetric to contralateral side

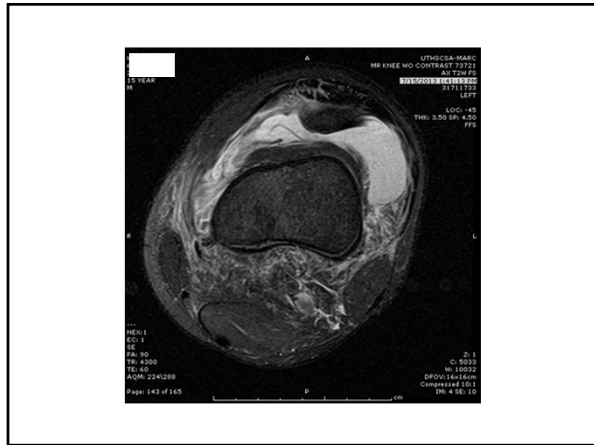






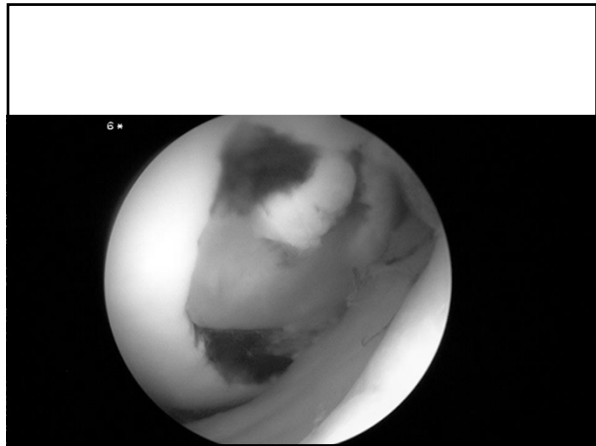
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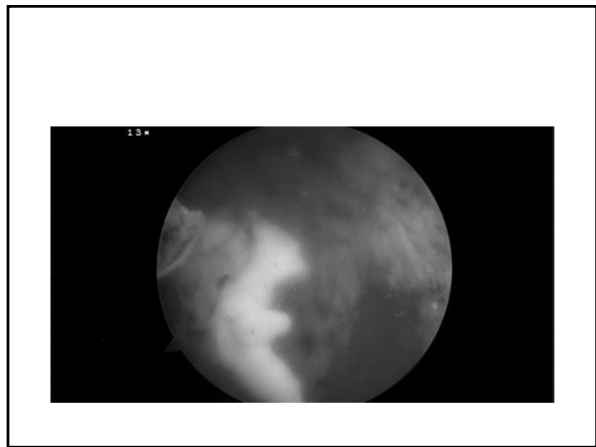


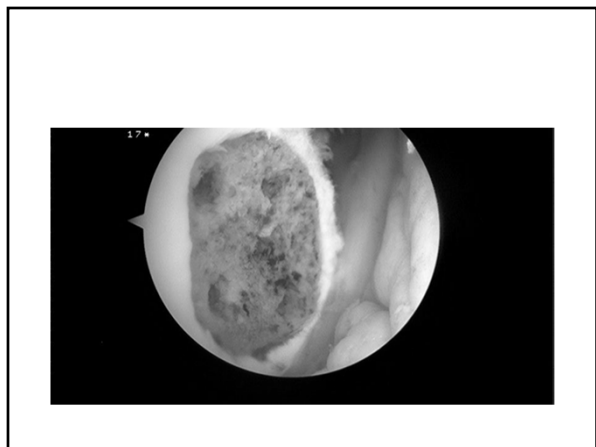




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MPFL Reconstruction

- ⊛ 1990s – Biomechanical Importance of MPFL
- ⊛ Techniques evolved
 - ⊛ Several graft choices
 - ⊛ Numerous fixation methods
- ⊛ All graft choices well exceed 208N threshold
- ⊛ Graft needed to guide patella into trochlea at 10-30deg
 - ⊛ Not expected to hold patella in place once engaged in trochlea

MPFL Reconstruction

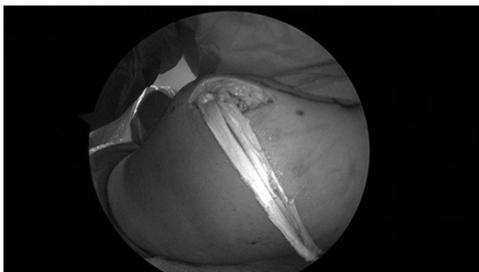
- ⊛ No gold standard technique
- ⊛ Numerous graft choices
 - ⊛ Hamstring
 - ⊛ Patella
 - ⊛ Quad
 - ⊛ allograft
- ⊛ Numerous fixation methods
 - ⊛ Tunnels
 - ⊛ Suture anchors
 - ⊛ Suture buttons
 - ⊛ Interference screws
 - ⊛ Screw and washer



Case 2

- 14 year old male
- Initial nonoperative management for first dislocation
 - Brace, PT
- 2 subsequent dislocations







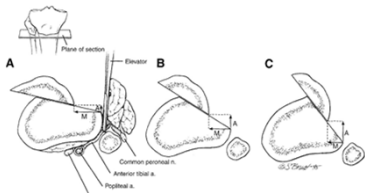
Rehabilitation

- ⊗ Repair or Reconstruction
 - ⊗ Immediate Weight bearing with brace locked
 - ⊗ 6 weeks locked
 - ⊗ Transition to functional patella brace
- ⊗ Immediate ROM with reconstruction
 - ⊗ Advance slowly to full ROM by 3 months
- ⊗ Start ROM at 4-6 weeks with repair
- ⊗ Running 3-4 months
- ⊗ Return to play typically at least 6 mos



Distal Realignment

- ⊗ Patella Alta
- ⊗ Increased Tibial Rotation (TT-TG > 20mm)
- ⊗ Fulkerson Osteotomy (Anteromedialization)



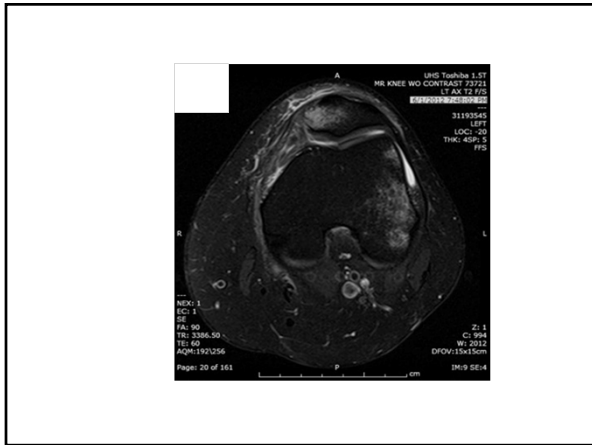
Case 3

- ⊛ 27 year old female with 10year history of left patella dislocations
- ⊛ Most recent 10 days prior to presentation



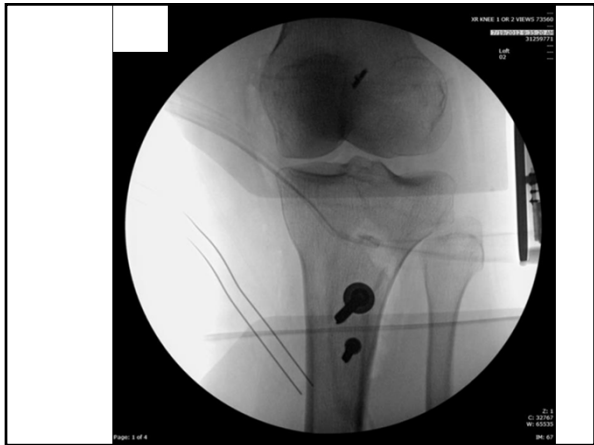


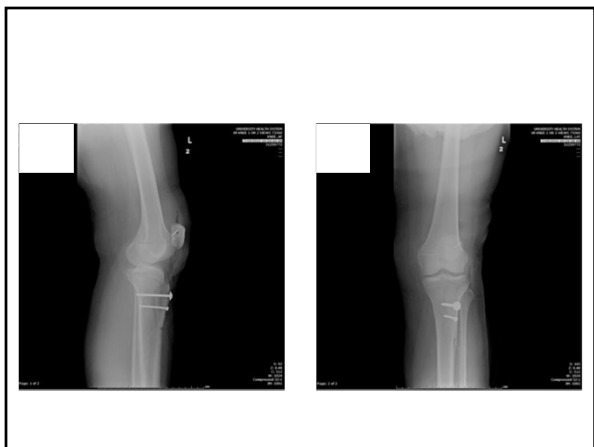












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Summary

- ⊗ The treatment for patellofemoral syndrome is physical therapy
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- ⊗ Easy to confuse patella dislocation for ACL injury
- ⊗ Non-operative treatment typical for primary patella dislocation
 - ⊗ 40-50% recurrence rate
- ⊗ Surgical management for 1st time dislocation
 - ⊗ Loose body – Arthroscopy with medial repair
 - ⊗ MPFL avulsion – medial sided repair
- ⊗ Recurrent Instability
 - ⊗ MPFL reconstruction
 - ⊗ Distal realignment
